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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,291	04/13/2007	Kazunori Shimazaki	5000-5323	6939

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EXAMINER	
KIM, HEE-YONG	

ART UNIT	PAPER NUMBER
2482	

NOTIFICATION DATE	DELIVERY MODE
03/17/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ptopatentcommunication@lockelord.com

Office Action Summary	Application No.	Applicant(s)	
	10/587,291	SHIMAZAKI, KAZUNORI	
	Examiner	Art Unit	
	HEE-YONG KIM	2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-9 and 11-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in reply to Applicant's Response dated January 31, 2011.

2. **Claims 1, 3 and 9** have been amended.

3. **Claims 1, 3-9, and 11-16** are pending.

Response to Arguments

4. Objections **to claims 3 and 4** are withdrawn because amendment of claim 3 overcomes the previous objections.

5. Applicant's arguments with respect to the prior art rejection over **claims 1, 3-9, and 11-16** have been considered but they are not persuasive.

6. Applicant argues (pp.7-8) that Shimazaki only discloses the same number of relational equations equal to the number of parameters to be corrected and therefore Shimazaki fails to disclose the same number of relational equations larger than the number of parameters. The examiner respectfully disagrees. Shimazaki clearly indicated that additional targets may be used (col. 12, line 26-43) and it leads to more relational equations than the number of parameters. Applicant further argues (pp.8) that Shimazaki does not disclose "coordinate conversion parameters including internal parameters of the camera itself, attachment parameters for attaching the camera to the vehicle and conversion constants to the monitor screen" as recited in newly amended claims 1 and 9. The examiner respectfully disagrees. Shimazaki clearly discloses

coordinate conversion parameters including internal parameters (positional deviation between the optical axe of the lens and the center of CCD area sensor, col.8, line 54-57) of the camera itself, attachment parameters (mounting position and mounting angles, col.8, line 54-57) for attaching the camera to the vehicle and conversion constants (eight parameters, col.8, line 58) to the monitor screen. Applicant further argues (pp.8-9) that Tanaka, although Tanaka discloses minimizing deviation, the deviation to be minimized in Tanaka is not "deviations between the monitor coordinates of the image of the actual targets actually captured by the camera and the corresponding monitor coordinates in the monitor coordinate system of the actual targets which have been subjected to the coordinates conversion" as recited in claims 1 and 9. The examiner maintains that it was obvious to the ordinary person in the art that Tanaka's minimizing deviation by square sum can be applied to finding conversion parameters in Shimazaki, in order to have the optimum parameters for the least square error.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 3-9, and 11-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimazaki (US 6,785,404) in view of Tanaka (US 6,201,882), hereafter referenced as Shimazaki and Tanaka respectively.

Regarding **claim 1**, Shimazaki discloses Image Positional Relation Correction Apparatus Steering Supporting Apparatus Provided with the Image Positional Relation Correction Apparatus, and the Image Positional Relation Correction Method. Specifically Shimazaki discloses An apparatus for correcting relative positional relationship between an actual video image captured by a camera and a virtual video image for use in a video image display device for superimposing the actual video image and the virtual video image on a monitor screen (Fig.1), comprising:

actual targets set in an actual coordinate system (Coordinate values of road surface coordinate system, col.8, line 59) in an area captured by the camera (Real Target by Camera Image, Fig.4);

coordinate conversion means (Logic Drawing Circuit 31, Fig.4) for theoretically deriving monitor coordinates in a monitor coordinate system on the monitor screen by coordinate conversion of actual coordinates of the actual targets in the actual coordinate system based on reference values of coordinate conversion parameters (Equation at Col.8, line 53) including internal parameters (positional deviation between the optical axe of the lens and the center of CCD area sensor, col.8, line 54-57) of the camera itself and attachment parameters (mounting position and mounting angles, col.8, line 54-57) for attaching the camera to the vehicle (eight parameters, col.8, line 58) and conversion constants (eight parameters, col.8, line 58) to the monitor screens;

recognition means for recognizing the monitor coordinates (Real Target by Camera Image, Fig.4) of the image of the actual targets actually captured by the camera; and correction means for correcting at least values of the internal parameters of the camera itself of the coordinate conversion parameters (Parameters are corrected by satisfying zero deviation between real and virtual points in monitor coordinate, col.9, line 1-52) based on deviations (ξn-ξn', col.9, line 17) between the monitor coordinates of the image (ξn', col.9, line 10-12) of the actual targets actually captured by the camera and the corresponding monitor coordinates (ξn, col.8, line 61-65) in the monitor coordinate system of the actual targets which has been subjected to the coordinate conversion (Conversion Equation at col. 8, line 52), and correcting relative positional relationship (ξn-ξn'=0, col.9, line 16-18) between the actual video image and the virtual video image based on the corrected values of the coordinate conversion parameters (parameters are set if ξn-ξn'=0, col.9, line 16-18),

the correction means generating relational expressions the number of which is larger (Additional virtual targets R5, R6... may be used, col.12, line 26-43, Examiner read it as normally 4 virtual targets can give 8 equations by generating x and y coordinates in each target, therefore more than 4 targets gives larger than number of parameters) than the number of the coordinate conversion parameters (8 parameters, col.8, line 58) based on the monitor coordinates (ξn', col.9, line 10-12) of the image of the actual targets, the monitor coordinates (ξn, col.8, line 61-65) in the monitor coordinate system of the actual targets which have been subjected to coordinate conversion (Conversion Equation at col. 8, line 52) and the deviation (ξn-ξn', col.9, line 17) between the

monitor coordinates of the image of the actual targets and the monitor coordinates in the monitor coordinate system of the actual targets which have been subjected to coordinate conversion;

the number of actual targets being determined such that the number of the relational expressions is larger than the number of the coordinate conversion parameters (Additional virtual targets R5, R6.. may be used, col.12, line 26-43, Examiner read it as normally 4 virtual targets can give 8 equations by generating x and y coordinates in each target, therefore more than 4 targets gives larger than number of parameters) which require correction,

the recognition means providing a virtual target in the monitor coordinate system on the monitor screen based on the coordinate conversion parameters before modification (Virtual Target by Logic Drawing, Fig.1) using the coordinate conversion means, and carrying out the recognition based on the difference (Monitor Screen, Fig.1, shows difference) between the monitor coordinate of the image of the actual target captured actually by the camera and the monitor coordinate of the virtual target.

However, Shimazaki fails to disclose the coordinate conversion parameters being corrected such that the square-sum of the deviations is the minimum.

In the analogous field of endeavor, Tanaka discloses Camera Calibration Apparatus. Tanaka specifically discloses the estimated parameters being corrected such that the square-sum of the deviations is the minimum (Co.10, 18-21), in order to have the optimum parameters.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Shimazaki by providing specifically the coordinate conversion parameters being corrected such that the square-sum of the deviations is the minimum, in order to have the optimum conversion parameters. The Shimazaki image positional relation correction apparatus, incorporating the Tanaka correcting estimated parameters such that the square-sum of the deviations is the minimum, has all the features of claim 1.

Regarding **claim 3**, Shimazaki and Tanaka disclose everything claimed as above (see claim 1). In addition, Shimazaki discloses wherein the recognition means includes a controller (controller (Up, Down, left, right arrows), Fig.7) for moving one of the actual target and the virtual target on the monitor screen to a position overlapped on the other of the actual target and the virtual target by manipulation of an operator.

Regarding **claim 4**, Shimazaki and Tanaka disclose everything claimed as above (see claim 3). In addition, Shimazaki discloses wherein the controller includes direction buttons (controller (Up, Down, left, right arrows), Fig.7) for inputting a correction amount of one of the actual target and the virtual target on the monitor screen in an up direction, a down direction, a left direction and a fight direction, a decision button for confirming a condition in which the actual target and the virtual target are overlapped with each other, and a calculation button (Calculation 66c, Fig.7) for allowing the correction means to start correction calculation.

Regarding **claim 5**, Shimazaki and Tanaka disclose everything claimed as above (see claim 1). In addition, Shimazaki discloses wherein the recognition means includes

an image processing circuit (Signal Processing IC 27 and Logic Drawing Circuit 61 and Superimposing Circuit 69, Fig.7) for carrying out the recognition by image processing.

Regarding **claim 6**, Shimazaki and Tanaka disclose everything claimed as above (see claim 1). In addition, Shimazaki discloses wherein the actual video image and the virtual video image are a video image at the back (rear image, col.1, line 18-20) of the vehicle and a steering assist guide (steering supporting guide, col.1, line 18-20), respectively.

Regarding **claim 7**, Shimazaki and Tanaka disclose everything claimed as above (see claim 6). In addition, Shimazaki discloses wherein the actual target is set on a road surface (data of vehicle rear view such as a road, col.5, line 40-42).

Regarding **claim 8**, Shimazaki and Tanaka disclose everything claimed as above (see claim 6). In addition, Shimazaki discloses wherein the actual target is set on a planar member attached to a rear portion of the vehicle (vehicle rear part bumper, col.5, line 40-42).

Regarding **claim 9**, the claimed invention is a method claim corresponding to an apparatus claim 1. Therefore, it is rejected for the same reason as claim 1.

Regarding **claim 11**, the claimed invention is a method claim corresponding to an apparatus claim 3. Therefore, it is rejected for the same reason as claim 3.

Regarding **claim 12**, the claimed invention is a method claim corresponding to an apparatus claim 5. Therefore, it is rejected for the same reason as claim 5.

Regarding **claim 13**, Shimazaki and Tanaka disclose everything claimed as above (see claim 1). Shimazaki further teaches wherein the recognition means

automatically recognizes the nearest actual target to the virtual target without displaying the virtual target (because the pair of the nearest actual target and the virtual target should be recognized in order to calculate the deviation of coordinates. Also it was obvious to calculate nearest actual target to the virtual target since both coordinates are known, col.8-9).

Regarding **claim 14**, Shimazaki and Tanaka disclose everything claimed as above (see claim 1). Shimazaki further teaches wherein the correction means calculates lines extending between new virtual targets based on the coordinate conversion parameters after modification, the lines being displayed on the monitor screen (solid lines and dotted lines of rectangles, Fig.9).

Regarding **claim 15**, the claimed invention is a method claim corresponding to an apparatus claim 13. Therefore, it is rejected for the same reason as claim 13.

Regarding **claim 16**, the claimed invention is a method claim corresponding to an apparatus claim 14. Therefore, it is rejected for the same reason as claim 14.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571-272-7905. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HEE-YONG KIM/
Examiner, Art Unit 2482

/Andy S. Rao/
Primary Examiner, Art Unit 2486
March 11, 2011